

What is claimed is:

1. An isolated nucleic acid molecule comprising the nucleotide sequence set forth in SEQ ID NO:1.
2. An isolated nucleic acid molecule encoding a polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 2.
3. An isolated nucleic acid molecule comprising a nucleotide sequence which is at least 50% identical to the nucleotide sequence of SEQ ID NO:1 or a complement thereof selected from the group consisting of;
  - a) a nucleic acid molecule comprising a fragment of at least 100 nucleotides of a nucleic acid molecule comprising the nucleotide sequence of SEQ ID NO:1 complement thereof;
  - b) a nucleic acid molecule which encodes a polypeptide comprising an amino acid sequence at least about 50% homologous to the amino acid sequence of SEQ ID NO:2; and
  - c) a nucleic acid molecule which encodes a fragment of a polypeptide comprising the amino acid sequence of SEQ ID NO:2, wherein the fragment comprises at least 15 contiguous amino acid residues of the amino acid sequence of SEQ ID NO:2.
4. An isolated nucleic acid molecule which hybridizes to the nucleic acid molecule of any one of claims 1, 2, or 3 under stringent conditions.
5. An isolated nucleic acid molecule comprising a nucleotide sequence which is complementary to the nucleotide sequence of the nucleic acid molecule of any one of claims 1, 2, or 3.
6. An isolated nucleic acid molecule comprising the nucleic acid molecule of any one of claims 1, 2, or 3, and a nucleotide sequence encoding a heterologous polypeptide.
7. A vector comprising the nucleic acid molecule of any one of claims 1, 2, or 3.

8. The vector of claim 7, which is an expression vector.
9. A host cell transfected with the expression vector of claim 8.
10. A method of producing a polypeptide comprising culturing the host cell of claim 9 in an appropriate culture medium to, thereby, produce the polypeptide.
11. An isolated polypeptide selected from the group consisting of:
  - a) a fragment of a polypeptide comprising the amino acid sequence of SEQ ID NO:2 , wherein the fragment comprises at least 15 contiguous amino acids of SEQ ID NO:2;
  - b) a naturally occurring homolog of a BLR polypeptide comprising the amino acid sequence of SEQ ID NO:2, wherein the naturally occurring homolog is isolated from a pathogenic bacterium and is encoded by a nucleic acid molecule which hybridizes to a nucleic acid molecule consisting of SEQ ID NO: 1;
  - c) a polypeptide which is encoded by a nucleic acid molecule comprising a nucleotide sequence which is at least 50 % identical to a nucleic acid molecule comprising the nucleotide sequence of SEQ ID NO:1;
  - d) a polypeptide comprising an amino acid sequence which is at least 50% identical to the amino acid sequence of SEQ ID NO:2.
12. The isolated polypeptide of claim 11 comprising the amino acid sequence of SEQ ID NO:2.
13. An antibody which selectively binds to a polypeptide of claim 12.
14. An agonist of a BLR polypeptide.
15. An antagonist of a BLR polypeptide.
16. A method for identifying compounds that modulate antibiotic resistance in a microbe comprising:
  - contacting a BLR polypeptide with a test compound;
  - determining the ability of the test compound to modulate the activity or expression of a BLR polypeptide; and
  - selecting those compounds that modulate the activity of the BLR polypeptide to thereby identify compounds that modulate antibiotic resistance.

17. The method of claim 16, wherein the BLR polypeptide is present in a microbial cell.

18. The method of claim 16, wherein the BLR polypeptide is heterologous to the cell in which it is present.

19. The method of claim 17, wherein the microbial cell is an E. coli cell.

20. The method of claim 17, wherein said step of determining comprises measuring the effect of the test compound on the ability of the microbial cell to grow in the presence of an antibiotic.

21. The method of claim 20, wherein the antibiotic is an antibiotic that affects peptidoglycan synthesis selected from the group consisting of a beta lactam, cycloserine, and bacitracin.

22. The method of claim 21, wherein said step of determining comprises measuring the efflux of the test compound or a marker compound from the cell.

23. The method of claim 16, wherein the BLR polypeptide is contacted with the test compound in vitro.

24. A method for identifying compounds that modulate antibiotic resistance in a microbe comprising:

contacting an isolated BLR nucleic acid molecule with a test compound;  
determining the ability of the test compound to bind to the isolated BLR nucleic acid molecule; and  
selecting those compounds that bind to the BLR nucleic acid molecule to thereby identify compounds that modulate antibiotic resistance.

25. The method of claim 24, wherein the BLR nucleic acid molecule comprises the nucleotide sequence shown in SEQ ID NO:1.

26. A method for identifying a protein that interacts with a BLR nucleotide sequence, comprising:

contacting a BLR nucleotide sequence with a microbial extract under conditions which allow interaction of components of the extract with the BLR nucleotide sequence; and measuring the ability of the BLR nucleotide sequence to

interact with the components thereby identify a protein that binds to a BLR nucleotide sequence.

27. A method for identifying a compound that modulates the ability of a BLR nucleic acid molecule to interact with a BLR binding polypeptide, comprising:  
 contacting at least one of a BLR nucleotide sequence and a BLR binding polypeptide with a test compound under conditions which allow interaction of the compound with at least one of the BLR nucleotide sequence and the BLR binding polypeptide; and measuring the ability of the compound to modulate the interaction of the BLR nucleotide sequence with the BLR binding polypeptide to thereby identify a compound that modulates the ability of a BLR nucleotide sequence to interact with a BLR binding polypeptide.

28. A method for identifying a compound that modulates the ability of a BLR polypeptide to interact with a BLR binding polypeptide, comprising:  
 contacting at least one of a BLR polypeptide and a BLR binding polypeptide with a test compound under conditions which allow interaction of the compound with at least one of the BLR polypeptide and the BLR binding polypeptide; and measuring the ability of the compound to modulate the interaction of the BLR polypeptide with the BLR binding polypeptide to thereby identify a compound that modulates the ability of a BLR polypeptide to interact with a BLR binding polypeptide.